



CRIMEMAP Archive

This is Part I of the NIJ Crime Mapping Research Center's plan to summarize past listserv discussions around specific topics relevant to crime mapping, and stimulate continued discussion.

Disclaimer: Points of view are those of the author and do not necessarily represent the view of the U.S. Department of Justice or the National Institute of Justice.

Geographic Profiling

Definition:

Geographic Profiling is an investigative technique for apprehending suspects that focuses on the geographic environment and considers how different criminals and criminal acts utilize geographic space differently. With this technique and understanding, law enforcement officers can better craft a search strategy and identify high probability areas of further criminal activity.

Kick-off Discussion:

Geographic Profiling, sometimes referred to as geoforensic profiling, is an information strategy designed to support serial (sometimes violent) crime investigations (e.g. murder, rape, or arson). Geographic profiling is used in conjunction with psychiatric profiling and standard investigative techniques. GIS (with its mapping and database component), can help resolve the problems in sharing information across jurisdictions to location and apprehend a suspects and close a criminal case.

The main contribution of geographic profiling to crime investigations lies in the fact that there are geographic components in any crime. These components begin with the location of the crime: Where was the victim encountered? Where was the victim attacked? Where was the victim murdered? Where was the body dumped? Where are vehicle or property drop sites? What are the access routes to/from the crime scene? Is the crime being committed in a rural or urban setting? What is the landuse of the crime site? By collecting these pieces of information,

an investigator increases his/her chances of detecting patterns that can be used to locate or inhibit the offender.

All people have a geographic pattern. People have detailed knowledge of certain areas and little knowledge of other areas. With this knowledge (or lack thereof) comes a degree of confidence in a person's ability to move in and about that area with few problems. Areas become more familiar as they are frequented more (i.e. the route from home to work). For criminals, these areas with a high level of comfort turn into areas in which to commit offenses. And although there are exceptions, most serial offenders have a starting point (e.g. home or work) from which the attacks are initiated.

The geographic profiling process begins by mapping the locations of the various crime scenes. One can then determine spatially, the offender's probable attacking area, which can be delineated with a closed shape (polygon circle or ellipse).

An important geographic property of serial offending is the rarity that an offender will attack close to his/her starting point. This means that the lack of an offense in an area is as much a spatial clue about an offender's starting point as the crime site locations. Another geographic property is that on average, serial offenders will attack within a fixed distance from their starting location. Also, prior research suggests that serial offenders commit their first crimes relatively far from their starting point, then move closer and closer to their starting point, and after dropping too many clues, they move farther and farther out again. So by combining these geographic properties, one can develop a model that can identify and create a search strategy.

References:

People doing research in geographic profiling:

P.J. and P.L Brantingham
D. Kim Rossmo
Jim LeBeau
David Canter
Roland Reboussin
Janet Warren
Maurice Godwin

Short "Kick off" bibliography:

P.J. and P.L Brantingham (1981) Environmental Criminology. Beverly Hills, CA: Sage.
P.J. and P.L Brantingham (1984) Patterns in Crime. New York: MacMillian.
Rossmo, D.K. (1995) "Place, Space and Police Investigations: Hunting serial Violent Criminals."
In J.E. Eck and D. Weisburd (eds.), Crime and Place. Crime Prevention Studies, Vol 4. Monsey, NY: Criminal Justice Press.
Rossmo, D.K. (1995) Geographic Profiling: Target Patterns of Serial Murders, Ph.D. dissertation, Simon Fraser University.

added since original posting

Godwin, M. (1998), Social Behavior and Personality, An Internatioanal Journal, 26, 75-84.

Warren, Reboussin, Hazelwood, Cummings, Gibbs, and Trumbetta, "Crime Scene and Distance Correlates of Serial Rape," Journal of Quantitative Criminology, Vol. 14, No. 1, March 1998, pp. 35-59.

Industry contacts doing research in geographic profiling:

ECRI (Environmental Criminology Research Inc.) in Vancouver, BC www.ecricanada.com

Discussion should help to address the following questions:

1. What is the state of the art in this subject?
2. What empirical data are available?
3. What should the research agenda be?
4. Who is performing research in this area?
5. What results are there?
6. What criminal justice agencies are making use of this knowledge?

Questions with direct responses posted on the news group (no editing, names withheld)

(From the Crimemap Listserv Archive: 01/22/1998 to 04/08/1998)

Q1. Has anybody done any studies looking at the psycho-geography of offenders (namely serial killers), concerned with the difference between urban and rural killings? Some colleagues of mine are investigating this using spatial geography analysis packages developed here and wondered if there are any previous studies.

A1a. You might check with Kim Rossmo. I believe he has done some work on this.

A1b. The work of Drs. Pat and Paul Brantingham in the geometry of crimes may be referred in their book called Environmental Criminology. One of their student Kim Rossmo, currently inspector with Vancouver police dept. Canada has developed a software entitled 'geographical profiling' and his Ph.D. thesis with Brantinghams deals with serial offenders and their 'hunting patterns'. Several case studies are examined from environmental criminology point of view, some of which are also rural based. what kind of software have your group developed?

A1c. Check with Roland Reboussin at the FBI Academy in Quantico, Virginia.

A1d. Kim Rossmo....(Geographical Crime Analysis) works for the Vancouver Police, Canada. His e-mail address is: Drossmo@sfu.ca

A1e I'm not sure if what these 'differences' are that you're looking for. However, Dr Kim Rossmo of Vancouver Canada (a practicing police officer and geographic profiler with the Vancouver Police Dept) has developed a system to identify the residence (or main anchor point) of serial criminals based upon the location of their crime sites.

This includes serial killers, rapists, arsonists, robberies, home invasions, and other serial crime types. You can check the Vancouver Police Dept web page at www.city.vancouver.bc.ca/police/ for further details. There was also a good article in the December '97 issue of Government Technology (a State and Federal magazine available in the USA) on geographic profiling and Dr Rossmo's work.

My company, Environmental Criminology Research Inc (also located in Vancouver), has taken Dr Rossmo's work and developed a commercially available computer system called Rigel (previously known as Orion). The Vancouver Police, the Ontario Provincial Police and the RCMP have purchased a number of these systems, and they have a number of individuals currently being trained as geographic profilers. This product is available to law enforcement agencies, and has been used to assist the FBI, Scotland Yard, West Mids police, Bureau of A,T and F, and many other police agencies worldwide.

If you need further information on Rigel/Orion and on geographic profiling, you can access our web site at www.ecricanada.com . I can send also you additional information via the mail if you wish.

A1f. This is in response to your post about psycho-geography of serial murderers in relation to differences between urban and rural killings.

I know of no empirical study looking directly at the differences between rural and urban. Having said that, it could be difficult to obtain valid serial murder data where offenders only lived and killed in a rural or urban area.

Many times, serial murderers troll for victims in cities or urban areas and dispose of their bodies in rural areas. In cases such as these, you could not divide the offenses up because they are living, killing, and dumping in different areas.

However, if you could find specific cases where the killer lived in a rural area, abducted or dump his victims in a rural area, then compare this to a sample that only lived, abducted or dumped in an urban area, then you would have a good study. Out of all the serial killers that I have in my data base, none abducted and killed in any one area.

Q2 Hello. Myself and a colleague are looking at the geographical spatial analysis of serial murder in relation to offence locality and population density, and were seeking past and present research in this area. We are familiar with the current research to date on geographical profiling (i.e. Kim Rossmo, Brantingham's etc.), but are more interested in specific research on the effects of population density on target selection/distance travelled to offences. We have been exploring various avenues of research, such as optimal foraging theory, circle hypothesis, etc. and would appreciate any assistance or suggestions. Thank you - we look forward to the replies.

A2a. Roland Rebousin and John Jarvis of the Behavioral Science Unit of the FBI at Quantico were doing some work on this. Roland just recently retired, but you should still be able to contact John.

A2b. In response > geographical spatial analysis of serial murder in relation > to offense locality and population density:

There is no specific research on serial murder and the type of information that you request. However, there is a considerable amount of similar spatial studies on rape, which the techniques then could be extrapolated to the serial murder data.

A2c. Your best bet is to examine the journey to crime literature. A summary of this research, with references, is in Table 2 of my dissertation, which the Investigative Psychology Department has a copy of. This may save you some time.

I don't believe that you'll find optimal foraging theory that applicable to most criminal spatial behaviour. Optimal foraging theory explains the behaviour of animals who hunt or search for food on a daily basis, often with minimal energy reserves. These two parameters do not apply to serial killers, rapists, etc. Such offenders do not usually commit their crimes on anything near a daily basis. And a series of unsuccessful hunts does not mean starvation and death for a killer or rapists - their reserves will not become depleted.

There are valid reasons for assuming the possibility of differences between rural, suburban, and urban offenders as their mental maps and the target backcloths can be quite different. But the first thing you need to do is to operationalize your definitions. Is a rural killer one who lives in rural area, one who encounters his/her victims in a rural area, one who dumps their bodies in a rural area,

or one who both encounters victims and dumps their bodies in a rural area? While I know several cases that are entirely urban, and a few cases that are entirely rural, most rural cases are mixed.

There is currently a large research project planned by the FBI, the University of Virginia, Dr. Roland Reboussin, Dr. Janet Warren, and myself that will examine victim population density issues in the spatial patterning of serial crime, but this has not yet started.

I hope this information is of help.

Q3. Does anyone know of any case studies or independent reviews of the use of geographic analysis in crime investigation ("geographic profiling", "geoforensic analysis" etc.) - following the work of Kim Rossmo, David Canter, James LeBeau and so on?

additions made after posting

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An addition to the bibliography:

Janet Warren, Roland Reboussin, Robert R Hazelwood, Andreas Cummings, Natalie Gibbs, and Susan Trumbetta, "Crime Scene and Distance Correlates of Serial Rape," Journal of Quantitative Criminology, Vol. 14, No. 1, March 1998, pp. 35-59.

Warren et al. analyze data from a non-random sample of 108 serial rapists (and 565 rapes) obtained through the FBI from police departments agencies throughout the United States. The data were based on victim statements according to the verbal, sexual and physical behavior manifest by the perpetrator and analyzed in terms of the travel patterns that the offenders created in locating their victims. The results suggest that the distance the rapist travels to rape varies systematically with certain of his demographic characteristics, his crime scene behavior and aspects of his criminal behavior. The goal of these analyses was to help inform the criminal investigative analysis conducted by the FBI on cases of unsolved serial rape. The Brantinghams' theory of a "safe area" around the offender's residence, where he avoids offending, was also supported by the data. These findings are tempered by the non-random nature of the sample and the fact that the sample represents apprehended offenders.

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Based on my analysis of 54 serial killers from the USA, the victims' abduction sites were located within the offenders' 'comfort zones,' while the victims' body dump sites fell outside of the offenders' comfort zones. I discuss this in a new article called Victim Target Networks in Serial Murder

Godwin, M. (1998), Social Behavior and Personality, An Internatioanal

Journal, 26, 75-84.

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Just a few points of clarification regarding the discussion on geographic profiling.

The main purpose of geographic profiling is to identify the most probable area of offender residence. While it would be helpful to determine high probability areas of further criminal activity, there currently is little research in this area. Beyond obvious patterns that crime analysts can sometimes pull out from a crime series, as an investigative technique it is seldom used.

Geographic profiling cannot close a criminal case. What it can do is help investigators focus their resources, prioritize their suspects and tips, and provide a basis for information management. They can then use their other tools and techniques more effectively in the effort to apprehend the criminal. Despite the depictions of television and Hollywood, the reality is that detectives (and more often patrol officers and the public) are the ones that solve crimes - not profilers. Our role is that of decision support.

Also, the term "geoforensic analysis" is rarely used - forensic means court, and the primary purpose of profiling is to assist in the investigative process, not (with certain exceptions) in the trial stage.

There is no company called Rigel Inc. Rigel is the name of the geographic profiling system developed by ECRI (Environmental Criminology Research Inc.) in Vancouver, BC. (Orion was the name of that system's prototype.) It uses the CGT (criminal geographic targeting) algorithm developed at Simon Fraser University.

Our research and experience does not show that offenders move closer, then further, from home over time. Some offenders, depending on certain conditions, do not vary their travel range. Most, however, slowly expand their spatial repertoire, increasing their range over time. In effect, it is the standard deviation of the journey-to-crime distance that increases.

The research I did for my PhD at SFU evaluated the CGT technique and found that, on average, the offender's residence could be determined within the top 5% of the crime site area. This was dependent upon the number of crime sites - the more locations, the more information, the greater the focus. Worse case scenarios have been 14%, best cases, under 1%.

The dissertation is available from dissertation abstracts. The contents of the dissertation, updated, with operational case studies, figures, and colour diagrams will be published in *Geographic Profiling* (1999), CRC Press: Boca Raton, FL. There was also a recent chapter in the book:

Jackson, J. L., & Bekerian, D. A. (Eds.). (1997). *Offender profiling:*

Theory, research and practice. Chichester: John Wiley & Sons.

Also, I will be making a presentation at the Crime Mapping Research Center Conference this December in Arlington, VA, as part of a panel talking about successful case studies.

Currently, only the Vancouver Police Department operates a Geographic Profiling Section. But come this fall, both the Royal Canadian Mounted Police (RCMP) and the Ontario Provincial Police (OPP) will be establishing their own units. Individuals from these agencies have been studying for the past year in a 12-month understudy program. They are currently in their last block of training, taking place in our offices, and will be operational in September.

While much research has taken place and is occurring, there is still very much that is not known. Some general thoughts:

future crime site prediction

serial rapist interviews

relationship between hunting method and psychological profile

empirical examination of the common temporal gaps in offending patterns

positive and negative (from the offender's perspective)

micro-environmental cues

correlates between crime geography and criminal record

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In response to Rossmo's post, my current research and soon to be published book too found that serial murderers travel further distances in early crimes and as they grow in confidence and experience, tend to move closer to their home base areas. This was true only for the body dump sites, not the victims' abduction sites.

Also, it is possible that a geographical profile could be used as part of a defense in trial.

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